there were no solar atmosphere would be $2.51 \times 1.50 = 3.76$, which is the photospheric solar constant A_1. The absorption of the solar atmosphere ranges from 33 per cent at angle 0° to 68.7 per cent at 90°; the mean being 44.4 per cent. Applying Stefan's law, this gives a temperature of 6830°C. for the solar photosphere. The author's values for the solar atmospheric absorption for rays of different wave-length, agree well with those of Abbot and Fowle; but the values of q not so well. As regards the spectrum of the photosphere, this is found to be very similar to the spectrum of a black body having the same temperature. The apparent distribution of the total energy over the sun's disk varies with the altitude above sea-level. Finally, since a black body at 6900° will yield 5 per cent of its energy in the form of light, by assuming 20 candles to be obtainable per watt at 7000° we arrive at the figure 150,000 candles per sq. cm. for the luminous intensity of the photosphere; that of the sun's disk is considerably lower, the mean intensity being about 67,000 candles per sq. cm. of surface.—*L. H. W[alter]*.

EFFECT OF ULTRA-VIOLET LIGHT ON THE EYE.[1]

By W. E. BURGE.

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Cataract is known to be prevalent in the tropics among glass-blowers and among elderly people. The most plausible explanation of the opacity of the eye-lens is that it is due to coagulation of the lens protein, just as egg-white and other proteins may lose their transparency when acted on by certain chemicals or exposed to heat. To test the possible effect of radiation in this respect, excised pig and ox lenses were exposed to an electric furnace, being almost submerged in open vessels containing egg-white, blood serum, aqueous and vitreous humor respectively. When the exposed lenses and media were placed in a tank of running water (with the mouth of vessel slightly above its surface), even an exposure of 100 hours failed to produce any opacity. In other cases in which the media were placed very close to the furnace opacity occurred, but the temperature of the lens had risen to 80°C., and the conclusion was drawn that this [temperature], and not the red or the infra-red radiation, had caused the coagulation. Exposures to the visible spectrum gave rise to similar results. The filament of a 2000–c. p. gas-filled lamp was focused on the lenses, but exposures for as much as 100 hours gave rise to no opacity. On the other hand, opacity could be produced in a few minutes by focusing the image of the sun on the lenses; but in this case also the rise in temperature was sufficient to account for the coagulation. Similar experiments regarding the effect of ultra-violet light were made. A Cooper Hewitt (2500–c. p.) quartz-tube mercury lamp was used. At a distance of 5 cm. below the tube coagulation of egg-white and blood-serum occurred after 20 minutes' exposure, but the lenses were unaffected even after 100 hours, the aqueous humor was still clear and the vitreous humor only slightly clouded. This is interesting, since practically all other protein substances can be coagulated by ultra-violet light.

Now the author, by the analysis of cataractous eyes obtained from India, has found a great increase over the normal in the percentage present of certain chemicals. For example, eyes from India contained appreciable amounts of silicates of potassium and calcium; and in other cases various salts of these metals and of magnesium have been found. The presence of these materials therefore seems to render the protein liable to coagulation. This was confirmed by the author, who repeated the exposure to ultra-violet light on lenses immersed in solutions of magnesium chloride, sodium silicate, and dextrose. Turbidity and even total opacity could be produced in these circumstances. The conclusion would seem to be that certain conditions of health, which give rise to abnormal quantities of such materials (those suffering from diabetes, for example, accumulate increased amounts of dextrose), also predispose the eyes to cataract.

There are thus two distinct factors: (1) the presence of these substances which modify the lens-protein, and (2) continual exposure to rays of short-wave length by which the modified protein may be precipitated. The effective region in the spectrum of the quartz lamp appears to be from 265$\mu\mu$ to 302$\mu\mu$, the former being the point of greatest activity.—*J. S. D[ow]*.

[1] Elect. World, April 10, 1915, p. 912-914.

ROTATION OF SOLAR CORONA.[2]

By J. BOSLER.

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During the eclipse of the sun on 1914 August 21, photographs of the spectrum of the corona were obtained with a 3-prism spectrograph giving a dispersion of 1 mm. = 32 Å. The eclipse was notable in that the chief corona line in the green region at λ5303 was extremely faint, and in consequence determinations of the rotation have been confined to measurements of the new line discovered in the red at λ6374.5 Wave-length determinations were made from comparison spectra of the ordinary sunlight 10 minutes after totality. Taking into account that the slit was inclined 18° to the solar equator, the resultant velocity of rotation of the corona gives an equatorial velocity of 3.9 km. per second. This result is in good agreement with that obtained by Campbell in 1898.—*C. P. B[utler]*.

ROTATION OF SOLAR CORONA.[3]

By H. DESLANDRES.

[*Reprinted from* Science Abstracts, Sec. A, Aug. 30, 1915, § 989.]

The importance of finding any definite value for the rotation of the solar corona is discussed from the point of view of its bearing on the theory of the constitution of the corona. Widely different values of the strength of the solar magnetic field have been obtained in different regions—a feeble value of 10^{-7}gauss by Deslandres, for the region of the high prominences, and a strong value of 50gauss by Hale for the lower layers of the solar atmosphere. If the coronal radiation is of the nature of electrified particles being projected outward, it would be reasonable to expect some influence on their velocity owing to their passage through the electric field, and this would modify to that extent the measures of the rotation velocity by line-of-sight measurements at the limb. It is suggested that in the future it would be better to arrange for an artificial comparison spectrum instead of using sunlight.—*C. P. B[utler]*.

[2] Comptes Rendus, April 6, 1915. 160: 434–437.
[3] Comptes Rendus, April 6, 1915, 160: 437–440.